

TOWN of ELLINGTON, CONNECTICUT DEPARTMENT of TOWN FIRE MARSHAL	UNDERGROUND FLAMMABLE and COMBUSTIBLE LIQUID STORAGE TANKS: TEMPORARY CLOSURE; PERMANENT CLOSURE; REMOVAL. (12/97)
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***AN INFORMATIONAL HAND-OUT DESIGNED TO ASSIST THE PUBLIC AND THEIR CONTRACTORS.***

The following are excerpts from the **Connecticut Flammable and Combustible Liquids Code** and **NFPA 30** (1996 ed.). They are a part of the **Connecticut General Statutes**, at Section 29-320-1a through 29-320-4a inclusive. This law is enforced by the **DEPARTMENT OF TOWN FIRE MARSHAL**. All questions concerning this material must be directed to this department .

**2-4.4 Temporary and Permanent Closure of Underground Tanks.**

**2-4.4.1** The procedures outlined in this subsection shall be followed when taking underground tanks temporarily out of service, closing them in place permanently, or removing them. All applicable safety procedures associated with working in proximity to flammable and combustible materials shall be strictly adhered to. (See Appendix C for additional information.)

**2-4.4.2** Taking Tanks Temporarily Out of Service. Tanks shall be rendered temporarily out of service only when it is planned that they will be returned to active service, closed in place permanently, or removed within a reasonable period not exceeding one year. The following requirements shall be met:

- (a) Corrosion protection and release detection systems shall be maintained in operation.
- (b) The vent line shall be left open and functioning.
- (c) The tank shall be secured against tampering.
- (d) All other lines shall be capped or plugged.

Tanks remaining temporarily out of service for more than one year shall be permanently closed in place or removed in accordance with 2-4.4.3 or 2-4.4.4, as applicable.

**2-4.4.3** Permanent Closure of Tanks in Place. Tanks shall be permitted to be permanently closed in place, if approved by the authority having jurisdiction. All of the following requirements shall be met:

- (a) All applicable authorities having jurisdiction shall be notified.
- (b) A safe workplace shall be maintained throughout the prescribed activities. (Special training might be required.)
- (c) All flammable and combustible liquids and residues shall be removed from the tank, appurtenances, and piping and shall be properly disposed of.
- (d) The tank shall be made safe by either purging it of flammable vapors or inerting the potential explosive atmosphere in the tank. Confirmation that the atmosphere in the tank is safe shall be by periodic testing of the atmosphere using a combustible gas indicator, if purging, or an oxygen meter, if inerting.
- (e) Access to the tank shall be made by careful excavation to the top of the tank.
- (f) All exposed piping, gauge and tank fixtures, and other appurtenances, except the vent, shall be disconnected and removed.
- (g) The tank shall be completely filled with an inert solid material.

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- (h) The tank vent and remaining underground piping shall be capped and removed.
- (l) The tank excavation shall be backfilled.

**2-4.4.4** Removal of Underground Tanks. Tanks shall be removed in accordance with the following requirements:

- (a) The steps described in 2-4.4.3(a) through (e) shall be followed.
- (b) All exposed piping, gauge and tank fixtures, and other appurtenances, including the vent, shall be disconnected and removed.
- (c) All openings shall be plugged, leaving a 1/4-inch opening to avoid buildup of pressure in the tank.
- (d) The tanks shall be removed from the excavation and shall be secured against movement.
- (e) Any corrosion holes shall be plugged.
- (f) The tank shall be labeled with its former contents, pressure vapor state, vapor-freeing method, and a warning against reuse.
- (g) The tank shall be removed from the site promptly, preferably the same day.

**2-4.4.5** Storage of Removed Tanks. If it is necessary to temporarily store a tank that has been removed, it shall be placed in a secure area where public access is restricted. The following requirements shall be met:

- (a) During such temporary storage, the atmosphere in the tank shall be periodically tested according to 2-4.4.3(d) to ensure that it remains safe.
- (b) A 1/4-inch opening shall be maintained to avoid buildup of pressure in the tank.

**2-4.4.6** Disposal of Tanks. Disposal of tanks shall meet the following requirements:

- (a) Before a tank is cut up for scrap or landfill, the atmosphere in the tank shall be tested in accordance with 2-4.4.3(d) to ensure that it is safe.
- (b) The tank shall be made unfit for further use by cutting holes in the tank heads and shell.

**2-4.4.7** Documentation. All necessary documentation shall be prepared and maintained, in accordance with all federal, state, and local rules and regulations.

**2-4.4.8** Reuse of Underground Tanks. Only those used tanks that comply with the applicable sections of this code and are approved by the authority having jurisdiction shall be installed for flammable or combustible liquids service.

**2-4.4.9** Change of service of Underground Tanks. Tanks that undergo any change of stored product shall meet the requirements of Section 2-2.

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## **Appendix C: Temporarily Out of Service, Closure in Place, or Closure by Removal of Underground Tanks**

*This Appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.*

### **C-1 Introduction**

C-1-1 Care is required not only in the handling and use of flammable or combustible liquids, but also in the process of rendering temporarily out of service, closing, or removing tanks that have held flammable or combustible liquids. This is particularly true of underground service station tanks that are most frequently used for the storage of motor fuel and occasionally for the storage of other flammable or combustible liquids, such as crankcase drainings (which can contain some gasoline). Through carelessness, explosions have occurred because flammable or combustible liquid tanks have not been properly conditioned before being rendered temporarily out of service, closed, or removed.

C-1-2 In order to prevent accidents caused by improper conditioning, it is recommended that the procedures outlined below be followed when underground tanks are temporarily taken out of service, closed, or removed.

C-1-3 Underground tanks taken out of service can be safeguarded or disposed of by any one of the following three means:

- (a) Placement in a temporarily out-of-service condition. Tanks should be rendered temporarily out of service only when it is planned that they will be returned to active service within a reasonable period or pending closure in place or closure by removal.
- (b) Permanent closure in place, with proper safeguarding.
- (c) Permanent closure by removal.

C-1-4 In cases where tanks are either rendered temporarily out of service or permanently closed, records shall be kept of tank size, location, date of closure, and method used for placing the closed tank in a safe condition.

C-1-5 Procedures for carrying out each of the above methods of disposing of underground tanks are described in the following sections. No cutting torch or other flame- or spark-producing equipment shall be used until the tank has been completely purged or otherwise rendered safe. In each case, the numbered steps given should be carried out successively.

### **C-2 Rendering Tanks “Temporarily Out of Service”.**

C-2-1 When the underground storage tank system (UST) is temporarily out of service for less than three months, the owners and operators must comply with the following:

- (a) Continue operation and maintenance of corrosion protection. Requirements can be found in U.S. Environmental Protection Agency (EPA), *Code of Federal Regulations*, Title 40, Part 280, “Technical Standards and Requirements for Owners and Operators of Underground Storage Tanks,” Paragraph 280.31.
- (b) Continue operation and maintenance of any release detection in accordance with U.S. EPA *Code of Federal Regulations*, Title 40, Part 280, Subpart D, or

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empty the UST system by removing all materials so that no more than 2.5 cm (1-inch) of residue, or 0.3 percent by weight of the total capacity of the UST system, remains in the system.

C-2-2 When a UST system is temporarily out of service for three months or more, owners and operators must also comply with the following requirements:

- (a) Leave vent lines open and functioning.
- (b) Cap or plug all other lines such as fill line, gauge opening, pump suction, and ancillary equipment. Secure against tampering.

**C-3** When a UST system is temporarily closed for more than 12 months, owners and operators must permanently close the UST system in accordance with U.S. EPA *Code of Federal Regulations*, Title 40, Part 280.71-280.74. An extension of this 12-month period can be granted by the implementing agency. However, before such an extension can be applied for, a site assessment must be completed in accordance with the U.S. EPA *Code of Federal Regulations*, Title 40, Part 280.72.

#### **C-4 Closure of Underground Tanks in Place.**

C-4-1 At least 30 days before beginning closure procedures, owners and operators must notify the implementing agency of their intent to close unless such action is in response to corrective action proceedings.

C-4-2 Closure of tanks either in place or by removal requires the owners and operators to measure for the presence of a release where contamination is most likely to be present at the UST site. This requirement can be satisfied if one of the external release detection methods allowed in the Code of Federal Regulations, Title 40, Part 280.43, (e) and (f), is operating in accordance with the requirements in Part 280.43 at the time of closure, and indicates no release has occurred.

C-4-3 Prepare a safe workplace by following the special safety precautions and cleaning and closing procedures in:

- (a) API 1604, *Removal and Disposal of Used Underground Petroleum Storage Tanks, or*
- (b) New England Interstate Water Pollution Control Commission (NEIWPCC), *Tank Closure Without Tears: An Inspector's Safety Guide.*

C-4-4 Safe work preparation should include:

- (a) No smoking in the area.
- (b) Shutting down all open flame and spark-producing equipment not necessary for the removal of the underground tank.
- (c) Using only hand tools to expose tank fittings and preparing for the vapor-freeing procedures.
- (d) Controlling static electricity or providing a conductive path to discharge static electricity by bonding or grounding equipment and vehicle.

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- (e) Roping off tank area from pedestrian and vehicular traffic.
- (f) Locating and marking all utility lines on site.
- (g) Determining meteorological conditions. Vapor accumulation can occur on still and high-humidity days. Under these conditions, test the area for vapor accumulation (refer to section C-4-10) and if present either provide additional forced ventilation or delay the job until there is a breeze and it is less humid. Excavated soil should be tested for vapor release. Artificial ventilation or repeated turning of excavated soil might be necessary to avoid ignitable concentration of vapors.
- (h) Ensuring that personnel are wearing hard hats, safety shoes, and safety glasses and that a combustible gas indicator is available. Providing any other safety measures or methods that might be required to meet local requirements.

C-4-5 Remove all flammable or combustible liquid and residue from the tank and from all connecting lines.

C-4-6 Residual product and solids must be disposed of properly.

C-4-7 Excavate to the top of the tank.

C-4-8 Disconnect the suction, inlet, gauge, and all other tank fixtures, except the vent line. The vent line should remain connected until the tank is purged.

C-4-9 Make the tank safe either by purging the tank of flammable vapors or inerting the potentially explosive atmosphere in the tank.

- (a) Purging or ventilating the tank replaces the flammable vapors in the tank with air, reducing the flammable mixture of fuel and oxygen below the lower explosive limit or LFL. Two methods can be used to introduce air into the tank. One is the use of a "diffused-air blower" to pump air into the bottom of the tank through the fill pipe or a properly bonded air-diffusing pipe. The second method is the use of an "eductor-type air mover", typically driven by compressed air. It draws vapors out of the tank and brings fresh air into the tank. The vent pipe can be used to exhaust vapors 12 feet above grade and 3 feet from any roof lines.
- (b) Inerting the tank does not replace the flammable vapors, but instead reduces the concentration of oxygen to a level insufficient to support combustion (refer to section C-4-10). Two inert gasses can be used. Carbon dioxide gas can be generated by crushing and distributing dry ice evenly over the bottom of the tank. The dry ice will release carbon dioxide as it warms. Nitrogen gas can be pumped into the tank from a hose through the fill hole to the bottom of the tank. Oxygen will be reintroduced into the tank unless all the holes are effectively plugged except for the vent.

C-4-10 Testing the tank to determine if it is safe:

- (a) When purging, a "combustible gas indicator" is used to measure the reduction in the concentration of flammable vapors. The meter reads from 0 to 100 percent of the LFL. The goal is to achieve a reading of 10 to 20 percent LFL for petroleum tanks.

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- (b) When inerting, an "oxygen meter" is used to determine when a tank has been successfully inerted. The meter reads from 0 to 100 percent oxygen content. The goal is to achieve a reading of 1 to 10 percent, which is safe for most petroleum products.

C-4-11 Fill the tank completely with an inert solid material. One or more holes can be cut in the tank top if existing tank openings are not adequate for the introduction of the inert material. Cap or remove remaining underground piping. The tank can now be backfilled.

## **C-5 Closure by Removal of Underground Tanks.**

C-5-1 Observe all procedures listed under Section C-4 except for Section C-4-11, filling the tank with an inert solid material and backfilling the excavation.

C-5-2 After the tank has been made safe by following purging or inerting procedures and before it is removed from the excavation, plug or cap all accessible holes. One plug should have a 1/4-inch vent hole to prevent the tank from being subjected to excessive differential pressure caused by temperature changes. This vent should be positioned on top of the tank during subsequent transportation or storage.

C-5-3 Excavate around the tank to uncover it for removal. Remove the tank from the excavation and check for corrosion holes in the tank shell. Use screwed boiler plugs to plug any corrosion holes.

C-5-4 Tanks should be labeled with information about the former contents, present vapor state, vapor freeing treatment method, and a warning against reuse.

C-5-5 Tanks should be removed from the site promptly and preferably the same day as removal since additional vapor can be released from liquid absorbed in tank wall corrosion or residues. However, before removal, the tank atmosphere must be checked to ensure the flammable vapor concentration does not exceed safe levels.

## **C-6 Disposal of Tanks.**

C-6-1 If the reuse of a tank is permitted by a controlling jurisdiction, the tank should be certified that it is tight, structurally sound, and will meet all requirements of a new installation.

C-6-2 The storage of used tanks should be in secure areas where the public will not have access. Tanks should be rendered safe consistent with Sections C-4-9 and C-4-10 and vented consistent with Section C-5-10.

C-6-3 If a steel tank is to be disposed of, it should be resettled for flammable vapors and, if necessary, again rendered gas-free. Tanks that have been lined internally or coated externally with fiberglass, epoxy-based, or similar materials might not be accepted by scrap processors. Before releasing to a scrap metal dealer, a sufficient number of holes or openings should be made in the tank to render it unfit for further use. NFPA 327, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers Without Entry*, provides information on safe procedures for such operations.

## **C-7**

If the tank to be disposed of is nonmetallic or is a steel tank lined internally or coated externally with fiberglass, epoxy-based, or similar materials, it might not be accepted by scrap metal

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dealers. An alternative disposal method would be to cut up the tank in sections suitable for disposal in a sanitary landfill.

#### **C-8**

Record keeping is required to demonstrate compliance with closure requirements under the *Code of Federal Regulations*, Title 40, Part 280.74. The results of the excavation zone assessment required in Part 280.72 must be maintained for at least three years after completion of permanent closure.

#### **C-9**

Other resources to check for information related to safety during tank closure include:

- (a) API 1604, *Removal and Disposal of Used Underground Petroleum Storage Tanks.*
- (b) API 1631, *Interior Lining of Underground Storage Tanks.*
- (c) API 2015, *Cleaning Petroleum Storage Tanks.*
- (d) API 2217A, *Guidelines for Work in Inert Confined Spaces in the Petroleum Industry.*
- (e) API 2219, *Safe Operating Guidelines for Vacuum Trucks in Petroleum Service.*
- (f) OSHA 2226, *Excavating & Trenching Operations.*
- (g) NIOSH, *Criteria for Recommended Standard for Working in Confined Spaces.*
- (h) NIOSH 87-113, *A Guide to Safety in Confined Spaces.*
- (i) NFPA 69, *Standard on Explosion Prevention Systems.* (Table with minimum oxygen levels necessary to support combustion for various products.)
- (j) NFPA 77, *Recommended Practice on Static Electricity.*
- (k) NFPA 326, *Standard Procedures for Safe Entry of Underground Storage Tanks.*
- (l) NFPA 327, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers Without Entry.*
- (m) NFPA 306, *Standard for the Control of Gas Hazards on Vessels.* (Practical procedures for vapor-freeing tanks and testing guidance.)
- (n) New England Interstate Water Pollution Control Commission, *Tank Closure Without Tears: An Inspector's Safety Guide.*